

UPGRADING OF THE SIMEIZ-1873 SLR STATION.

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In 1999-2000 the performance of the SIMEIZ-1873 satellite laser station has been greatly improved due to valuable assistance of Michael Pearlman and Daniel Nugent and with the financial support of the CRDF grant UG1-332. A description of the system configuration is shown in Table 1. Now the station is still operating in semiautonomous ranging mode with night tracking, but an upgrading of the SLR software and an installation of the new laser generator are planned in the nearest future. In 2001 more than 550 satellite passes have been tracked with the improved precision. The SLR station is collocated with the permanent GPS receiver and the Crimean VLBI station is 1.3 km away.

Mount Configuration	AZ/EL
Laser Type	ND:YAG
Primary Wavelength	532 nm
Pulse Energy	30-80 mJ
Repetition Rate	1 Hz
Receiver Aperture Dia.	1m (70 cm)
Detector Type	PMT(H6533)
Time Counter	HP 5370B (20 ps precision)
Angular sensors	Farrand-Controls (0.4")

Table1 . SIMEIZ-1873 SLR System Configuration.

Main features SLR-“Simeiz-1873”

1. Telescope:
 - a. 1 meter mirror;
 - b. mount configuration – azimuth/elevation with Qude focus;
 - c. Maximum ranging speed is 2.8 grad/sec.
2. Impulse energy registered to improve signal detection.
3. Laser transmitter:
 - a. Impulse length is 350-450 ps;
 - b. Impulse energy is 30-80mj;
 - c. Wave length is 532 nm;
 - d. Divergence is 10-120”;
4. In main telescope guide installed electronic-optical amplifier EOA-16;
5. All complex carried by one computer (Pentium-2).

After modernization, in frame of grant UG1-332 from CRDF, performance of our telescope was significantly improved. By important help from Michael Pearlman and Daniel Nugent, we are able to install all of equipment:

6. Angular encoders FARRAND CONTROLS with accuracy 3”-4”;
7. Time interval counter HP 5370B with measurements accuracy 20 ps;
8. Photomultiplier H6533 with no stabilities in 150ps.;
9. After EOA-16 installed video camera CCD B/W and on a computer monitor we can view all kinds of the satellites in filed view 15^m width.

By direct agreement, UNAVCO and Crimean astrophysical observatory on station “Simeiz-1873” was installed GPS station “CRAO” with receiver SNR-8000.

10. Signals of accurate time now received from GPS station;
11. Now SLR station work only on night / semiautomatic mode.

Some work SLR team made:

12. Construction of our telescope is not optimal, and to install new angular encoders additional changing in telescope construction were made (see fig. 1);
13. To carry telescope engines new hardware was created.
14. To work with all of new hardware and ranging satellite fully new software was created.
15. SLR team made all installation, wiring and creating some mechanical parts.

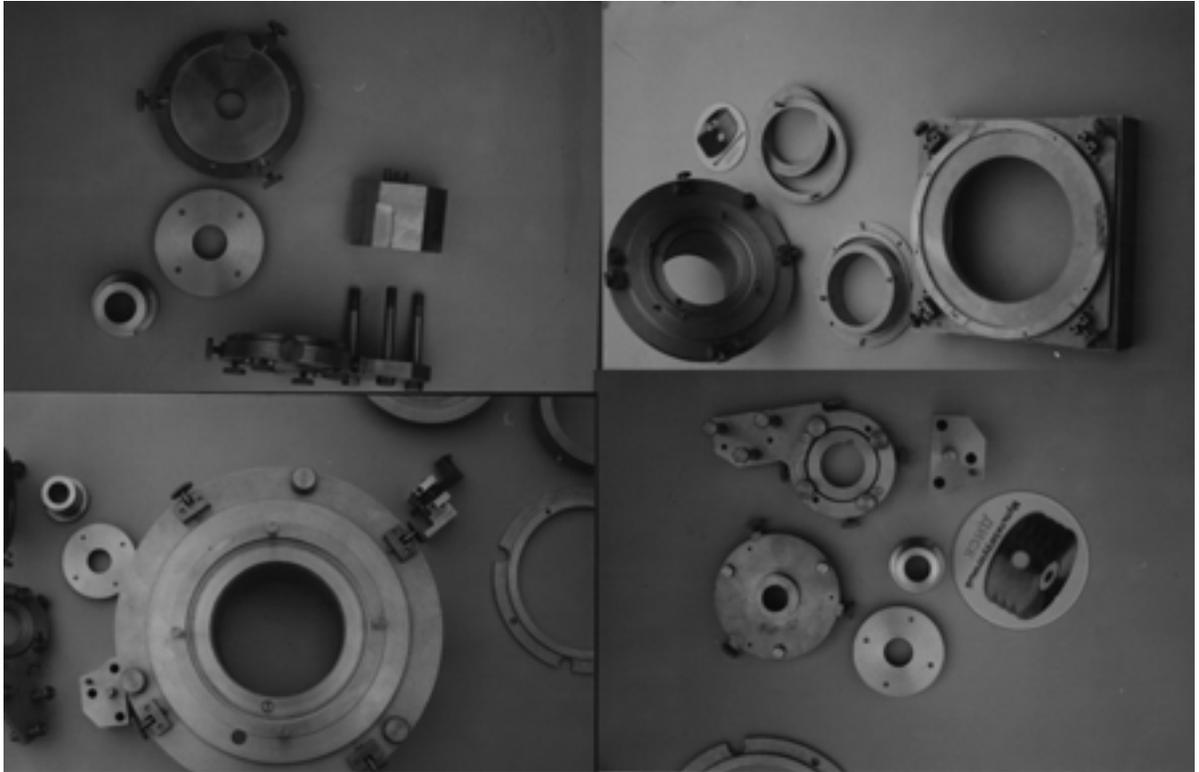
As a result in 2001 first ranging start on modern equipment. First time in all station history, we made 553 series with 96 Lageos. For comparison in period 1996 — 2000 year, our station made 603 series with 70 Lageos.

All operational results were preparing in about 10 hours. Direct internet connection give nice condition to quick sending and receiving information.

Some results of modernization steps were present on next conferences: “Astrometry, geodynamics and celestial mechanics on 21 centuries” Sankt-Peterburg, Russia, 2000; “Second Ukraine conference of space investigation perspectives”, Katcively, Ukraine, 2002.

Acknowledgments

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Figures. 1. Some mechanical parts were made to install angular encoders. All of its were made by SLR team.



Figure 2. SLR station "Simeiz-1873"